

Appl. No. 10/766,532
Amdt. Dated June 7, 2006
Reply to Office Action of March 7, 2006

Attorney Docket No. 81880.0113
Customer No.: 26021

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An electrostatic chuck comprising:
a circular ceramic plate having an electrostatic attractive electrode;
a mounting surface for supporting a wafer formed on one of the main surfaces of the circular ceramic plate;
an annular gas groove formed on the periphery of the mounting surface in the form of concentric circles and a first gas inlet which communicates with the annular gas groove; and
a circular gas recess formed inside the circular ceramic plate, and a second gas inlet which communicates with the circular gas recess,
wherein the annular gas groove and the circular gas recess are independently separated from each other by a first annular rib protrusion, and
wherein with a plurality of dotted protrusions being disposed within both the annular gas groove and the circular gas recess.
2. (Original) The electrostatic chuck according to claim 1, wherein the circular gas recess has a diameter which is set to 70 to 95% of the outer diameter of the mounting surface.

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3. (Original) The electrostatic chuck according to claim 1, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 1 to 5 mm.

4. (Original) The electrostatic chuck according to claim 1, wherein:
the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 1 to 5; and
the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 1 to 5.

5. (Original) The electrostatic chuck according to claim 1 wherein the circular ceramic plate has a heating element for heating the wafer buried in the ceramic plate or attached to the other main surface of the ceramic plate.

6. (New) The electrostatic chuck according to claim 1, wherein the circular ceramic plate comprises at least one from the group consisting of aluminum nitride, silicon carbide and boron nitride which have heat conductivity of not less than 50W/(m - K).

7. (New) The electrostatic chuck according to claim 2, wherein the circular ceramic plate comprises at least one from the group consisting of aluminum nitride, silicon carbide and boron nitride which have heat conductivity of not less than 50W/(m - K).

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8. (New) The electrostatic chuck according to claim 2, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 1 to 5 mm.

9. (New) The electrostatic chuck according to claim 6, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 1 to 5 mm.

10. (New) The electrostatic chuck according to claim 2, wherein the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 1 to 5; and the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 1 to 5.

11. (New) The electrostatic chuck according to claim 3, wherein the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 1 to 5; and the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 1 to 5.

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12. (New) The electrostatic chuck according to claim 1, wherein the diameter of the circular gas recess is set to 80 to 90% of the diameter of the mounting surface.

13. (New) The electrostatic chuck according to claim 3, wherein the diameter of the circular gas recess is set to 80 to 90% of the diameter of the mounting surface.

14. (New) The electrostatic chuck according to claim 6, wherein the diameter of the circular gas recess is set to 80 to 90 % of the diameter of the mounting surface.

15. (New) The electrostatic chuck according to claim 1, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 2 to 3 mm.

16. (New) The electrostatic chuck according to claim 2, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 2 to 3 mm.

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17. (New) The electrostatic chuck according to claim 6, wherein the first annular rib protrusion surrounded by the outer circumference of the circular gas recess and the inner circumference of the annular gas groove has a width in a range of 0.5 to 5 mm, and an second annular rib protrusion surrounded by the outer circumference of the mounting surface and the outer circumference of the annular gas groove has a width in a range of 2 to 3 mm.

18. (New) The electrostatic chuck according to claim 1, wherein the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 2 to 4; and the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 2 to 9.

19. (New) The electrostatic chuck according to claim 2, wherein the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 2 to 4; and the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 2 to 3.

20. (New) The electrostatic chuck according to claim 6, wherein the ratio S1/S2 of the area S1 of the circular gas recess to a total area S2 of the upper surfaces of the dotted protrusions disposed inside the circular gas recess is set in a range of 2 to 4; and the ratio S3/S4 of an area S3 of the annular gas groove to a total area S4 of the upper surfaces of the dotted protrusions formed inside the annular gas groove is set in a range of 2 to 3.